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**IN THE CLAIMS:**

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claim 8 and AMEND claims 1, 13, 16 and 19-21 in accordance with the following:

1. (Currently Amended) A robot system including a beacon with a transmitting part to transmit light to determine location, and a mobile robot with a receiving part to receive the light,

the beacon comprising:

a rotation driving part to rotate the transmitting part; and

an encoder to add phase information regarding rotation of the transmitting part to the light, and

the mobile robot comprising:

a location determiner to determine a location of the mobile robot based on the phase information of the light received by the receiving part,

wherein the rotation driving part outputs information on a phase shift of the transmitting part relative to a reference direction of the rotation driving part of the beacon in accordance with the rotation of the rotation driving part, and

wherein the location determiner determines the location of the mobile robot based on a displacement of the mobile robot, and the phase information received by the receiving part.

2. (Previously Presented) A robot system including a beacon with a transmitting part to transmit light to determine location, and a mobile robot with a receiving part to receive the light,

the beacon comprising:

a rotation driving part to rotate the transmitting part; and

an encoder to add phase information regarding rotation of the transmitting part to the light, and

the mobile robot comprising:

a location determiner to determine a location of the mobile robot based on the phase

information of the light received by the receiving part,

wherein the transmitting part further comprises: at least one transmitter spaced from another transmitter and rotated by the rotation driving part.

3. (Original) The robot system according to claim 1,  
wherein the transmitting part further comprising:  
a mirror disposed at an incline with respect to a horizontal direction; and  
a transmitter to emit the light at a predetermined incident angle;  
wherein: the rotation driving part rotates the mirror, and the encoder adds the phase information regarding rotation of the mirror to the light.

4. (Original) The robot system according to claim 3, wherein the transmitting part further comprising:  
two transmitters to emit light towards double sides of the mirror.

5. (Original) The robot system according to claim 1, wherein the receiving part further comprising:  
at least one receiver to receive the light transmitted from the transmitting part.

6. (Original) The robot system according to claim 1, wherein the receiving part further comprising:  
a conical mirror to reflect light from various directions towards one direction; and  
a receiver to receive the light reflected from the conical mirror.

7. (Original) The robot system according to claim 1, wherein the beacon has inherent beacon information, and the encoder adds the beacon information and the phase information to the light.

8. (Cancelled)

9. (Cancelled)

10. (Original) The robot system according to claim 1, wherein the robot system further

comprises:

a plurality of beacons.

11. (Previously Presented) The robot system according to claim 10, wherein the beacons have beacon information and the encoder encodes or modulates the beacon information of the plurality of beacons with the phase information to the light.

12. (Previously Presented) The robot system according to claim 1, the beacon further comprising:

at least one mirror to reflect an incident light from the transmitting part at a predetermined angle.

13. (Currently Amended) A robot system including a beacon with a transmitting part to transmit light to determine location, and a mobile robot with a receiving part to receive the light,

the beacon comprising:

a rotation driving part to rotate the transmitting part; and

an encoder to add phase information regarding rotation of the transmitting part to the light, and

the mobile robot comprising:

a location determiner to determine a location of the mobile robot based on the phase information of the light received by the receiving part,

wherein the beacon further comprises:

at least one transmitter of the transmitting part provided to emit light towards respective sides of the double sided mirror at a predetermined angle; and

at least one mirror is a double sided mirror to reflect incident light rays from the at least one transmitter at a predetermined angle.

14. (Previously Presented) The robot system according to claim 5, wherein the at least one receiver further comprises:

a conical mirror to concentrate light transmitted.

15. (Original) The robot system according to claim 10, wherein each of the plurality of beacons have different inherent beacon information.

16. (Currently Amended) A robot system including a mobile robot, comprising:  
a plurality of beacons;  
at least one transmitter provided to at least one of the beacons to transmit light to determine location of the mobile robot;  
at least one receiver provided to the mobile robot to receive the light transmitted via the at least one transmitter;  
a rotation driving part to rotate the at least one transmitter;  
an encoder to add phase information regarding rotation of the at least one transmitter with respect to a reference direction to the light; and  
a location determiner to determine a location of the mobile robot based on the phase information of the light received by the at least one receiver,  
wherein the rotation driving part outputs information on a phase shift of the transmitting part relative to a reference direction of the rotation driving part of the beacon in accordance with the rotation of the rotation driving part, and  
wherein the location determiner determines the location of the mobile robot based on a displacement of the mobile robot, and the phase information received by the at least one receiver.

17. (Original) The robot system according to claim 16, wherein each of the plurality of beacons have different inherent beacon information.

18. (Original) The robot system according to claim 17, wherein the mobile robot determines the source of received phase information, and calculates a location of the mobile robot.

19. (Currently Amended) A beacon to generate light to determine location of a mobile robot, comprising:  
a transmitting part to transmit the light to determine the location;  
a rotation driving part to rotate the transmitting part; and  
an encoder to add phase information regarding rotation of the transmitting part,  
wherein the rotation driving part outputs information on a phase shift of the transmitting part relative to a reference direction of the rotation driving part of the beacon in accordance with the rotation of the rotation driving part, and

wherein the location of the mobile robot is determined based on a displacement of the mobile robot, and the phase information.

20. (Currently Amended) The beacon according to claim 19, wherein the transmitting part further comprisesing:

at least one transmitter rotated by the rotation driving part.

21. (Currently Amended) The beacon according to claim 19, wherein the transmitting part further comprisesing:

a mirror disposed at an incline with respect to a horizontal direction;

a transmitter to emit the light at a predetermined incident angle; wherein

the rotation driving part rotates the mirror; and

the encoder adds the phase information regarding rotation of the mirror to the light.

22. (Previously Presented) The beacon according to claim 21, wherein the mirror includes double sides and the transmitting part further comprises:

two transmitters to emit light towards the double sides of the mirror.

23. (Original) The beacon according to claim 19, wherein the transmitting part has inherent information, and the encoder adds the beacon information and the phase information to the light.

24. (Previously Presented) The robot system according to claim 12, wherein the at least one mirror is a single sided mirror to reflect an incident light from the transmitting part at a predetermined angle.